

Cascade 4300 4.3" Panel Mount HMI Specification

Model: FBDA8281-50

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Date	Page	Summary
4/30/2009	Rev: 1	Preliminary Release
6/1/2009	Rev: 2	Removed separate RS-232 connector Added part numbers for speaker and mic Added PCB drawings
6/23/2009	Rev: 3	Updated OS Image download procedure.
6/25/2009	Rev: 4	Corrected mating part numbers for J1 and J3.
1/13/2009	Rev: 5	Clarified pin functions for J3
5/12/2010	Rev: 6	Updated address

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1. General Specifications

Table 1

Parameter	Specification	Unit
Screen Size	4.3 (Diagonal)	inch
Display Format	480 RGB x 272	pixels
Active Area	95.04 (W) x 53.856 (H)	mm
Pixel Size	198 (W) x 198 (H)	μm
Colors	16,777,216 (24-bit)	colors
Brightness	350 (Maximum)	cd/m ²
Touch Screen	4-Wire Resistive	—
Outline Dimensions	148 (W) x 99 (H) x 35 (D)	mm
Weight	400 (complete unit)	g
Viewing Angle	6 o'clock	—
Speaker	2	watts
Processor	ARM920T	—
Speed	533	MHz
Flash Memory	64	MB
Operating System	Win CE 5.0	—
Operating Temperature	0 to 50	°C
Storage Temperature	-40 to 85	°C

2. Electrical Specifications and Configuration

Table 2

Parameter	Symbol	Min.	Max.	Unit	Remark
Power Voltage	V _{CC}	11.4	12.6	V	Note 1
Power Current	I _{CC}	—	1	A	Note 2

Note 1: Power plug is 5.5mm outer diameter, 2.10mm inner diameter, center positive.

Note 2: Maximum current includes 0.5A for USB host port.

3. External Connectors

3.1. RS-485

Tied to UART2 on the processor.

Port is half-duplex.

Connector is standard RJ-11 (phone jack).

Table 3

Pin No.	Symbol	Description	Remarks
1	Shield	Cable shield	Optional
2	A	RS-485 A Signal	Note 1
3	GND		
4	GND		
5	B	RS-485 B Signal	Note 1
6	GND		

Note 1: The Request To Send (RTS) line is used for flow control. When RTS is high the unit is transmitting; when RTS is low the unit is receiving.

3.2. Ethernet

Connector is standard RJ-45.
 Pinout follows standard Ethernet pinout.
 Ethernet port is 10/100.
 Power over Ethernet (POE) is not supported.

3.3. USB 1.1 Host

Connector is standard USB Type A.
 Pinout follows standard USB Type A pinout.
 USB is host at full speed (12 Mbps).

3.4. USB 2.0 Device

Connector is mini-USB Type B.
 Pinout follows standard USB Type B pinout.
 USB device supports both full speed (12 Mbps) and high speed (480 Mbps).

4. Internal Connectors

4.1. Connector Layout

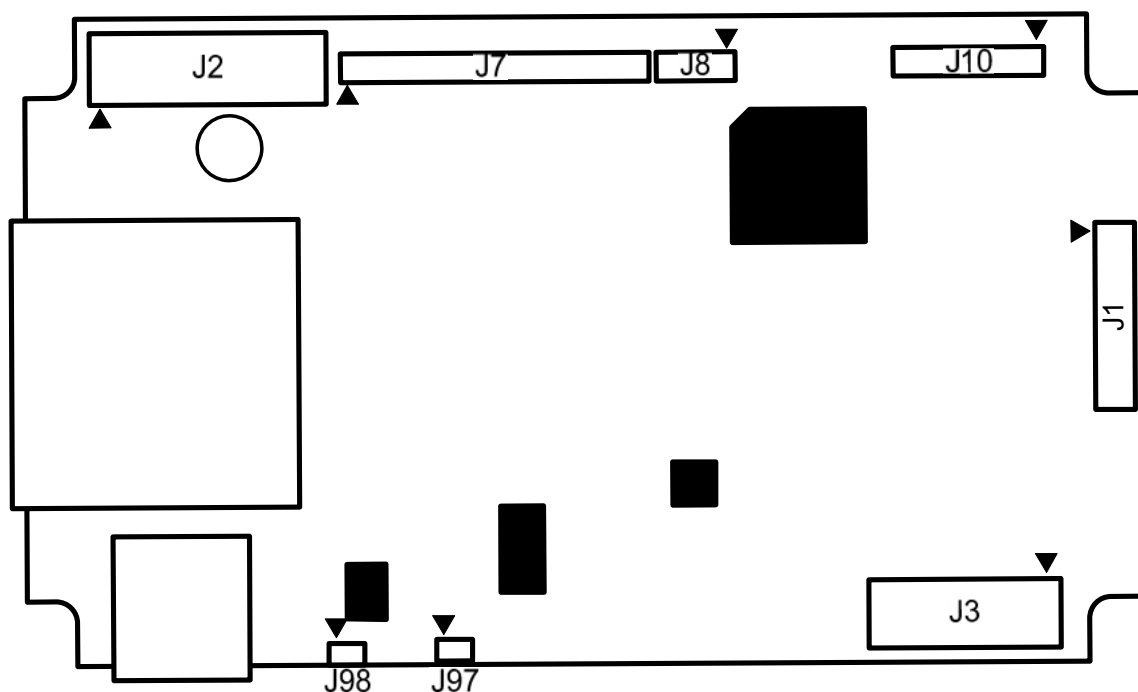


Table 4

Connector Designation	Description
J2	JTAG
J7 and J8	System Bus
J10	General Purpose I/O
J1	UART, SPI, I ² C, and INT
J3	Ethernet, UART, and RS-485
J97	Microphone
J98	Speaker

4.2. JTAG (J2)

Connector part number is equivalent to Molex 015-91-0200.

Mating connector is Molex 022-55-2201 or equivalent.

Table 5

Pin No.	Symbol	Description	Remarks
1	3.3V	Power	
2	3.3V	Power	
3	nTRST	TAP Reset	Connected to nTRST on processor
4	GND	Ground	
5	TDI	TAP Data Input	Connected to TDI on processor
6	GND	Ground	
7	TMS	TAP Mode Select	Connected to TMS on processor
8	GND	Ground	
9	TCK	TAP Clock	Connected to TCK on processor
10	GND	Ground	
11	N/C	No connect	
12	GND	Ground	
13	TDO	TAP Data Output	Connected to TDO on processor
14	GND	Ground	
15	RESET	Reset	Drive low to reset entire system
16	GND	Ground	
17	N/C	No connect	
18	GND	Ground	
19	N/C	No connect	
20	GND	Ground	

4.3. System Bus (J7 and J8)

J7 connector part number is equivalent to Samtec FLE-125-01-G-DV-A.

Mating cable is Samtec FFMD-25-S-02.00-01 or equivalent.

Table 6

Pin No.	Symbol	Description	Remarks
1	GND	Ground	
2	GND	Ground	
3	RDATA1	Data Bus 1	
4	RDATA0	Data Bus 0	
5	RDATA3	Data Bus 3	
6	RDATA2	Data Bus 2	
7	RDATA5	Data Bus 5	
8	RDATA4	Data Bus 4	
9	RDATA7	Data Bus 7	
10	RDATA6	Data Bus 6	
11	RDATA9	Data Bus 9	
12	RDATA8	Data Bus 8	
13	RDATA11	Data Bus 11	
14	RDATA10	Data Bus 10	
15	RDATA13	Data Bus 13	

16	RDATA12	Data Bus 12	
17	RDATA15	Data Bus 15	
18	RDATA14	Data Bus 14	
19	3.3V	Power	100 mA
20	3.3V	Power	100 mA
21	RADDR16	Address Bus 16	
22	RADDR17	Address Bus 17	
23	RADDR18	Address Bus 18	
24	RADDR23	Address Bus 23	
25	nRCS2	Memory Chip Select 2	SRAM Address 0x1000:0000 to 0x1040:0000
26	nRCS3	Memory Chip Select 3	SRAM Address 0x1800:0000 to 0x1840:0000
27	nRCS4	Memory Chip Select 4	SRAM Address 0x2000:0000 to 0x2040:0000
28	nRCS5	Memory Chip Select 5	SRAM Address 0x2800:0000 to 0x2840:0000
29	nRBE0	Byte selection	Upper/lower byte selection; used with 16-bit SRAM
30	nRBE1	Byte selection	
31	nRWE	Write Active	L = Write cycle is active, H = Write cycle is not active
32	nROE	Read Active	L = Read cycle is active, H = Read cycle is not active
33	RADDR1	Address Bus 1	
34	RADDR0	Address Bus 0	
35	RADDR3	Address Bus 3	
36	RADDR2	Address Bus 2	
37	RADDR5	Address Bus 5	
38	RADDR4	Address Bus 4	
39	RADDR7	Address Bus 7	
40	RADDR6	Address Bus 6	
41	RADDR9	Address Bus 9	
42	RADDR8	Address Bus 8	
43	RADDR11	Address Bus 11	
44	RADDR10	Address Bus 10	
45	RADDR13	Address Bus 13	
46	RADDR12	Address Bus 12	
47	RADDR15	Address Bus 15	
48	RADDR14	Address Bus 14	
49	GND	Ground	
50	GND	Ground	

J8 connector part number is equivalent to Samtec FLE-106-01-G-DV-A.
 Mating cable is Samtec FFMD-06-S-02.00-01 or equivalent.

Table 7

Pin No.	Symbol	Description	Remarks
1	nWAIT	Bus Wait Request	L = Suspend bus cycle, H = continue; tied to nWAIT input on processor; pulled high
2	EINT11/GPG3	GPIO Port G Bit 3 (also External Interrupt 11)	Tied to EINT11/GPG3 on processor
3	RESET	Reset	Drive low to reset entire system
4	EINT17/GPG9	GPIO Port G Bit 9 (also External Interrupt 17)	Tied to EINT17/GPG9 on processor
5	GPG14	GPIO Port G Bit 14	
6	RSMABD	SRAM Bus Address Valid	Refer to chapter 5 of the Samsung 2443 User Manual
7	nROE	Read Active	L = Read cycle is active, H = Read cycle is not active
8	RSMCLK	SRAM Bus Clock	Refer to chapter 5 of the Samsung 2443 User Manual
9	GPB7	GPIO Port B Bit 7	
10	RSMBWAIT	SRAM Bus Burst Wait	Refer to chapter 5 of the Samsung 2443 User Manual
11	EINT13/GPG5	GPIO Port G Bit 5 (also External Interrupt 13)	Tied to EINT13/GPG5 on processor
12	GND	Ground	

4.4. General Purpose I/O (J10)

Connector part number is equivalent to Samtec FLE-111-01-G-DV-A.

Mating cable is Samtec FFMD-11-S-02.00-01 or equivalent.

Table 8

Pin No.	Symbol	Description	Remarks
1	GND	Ground	
2	GND	Ground	
3	GPJ0	GPIO Port J Bit 0	
4	nSS1	SPI Active	
5	GPJ1	GPIO Port J Bit 1	
6	MISO1/GPL12	GPIO Port L Bit 12 (also SPI Master Input)	Tied to SPIMISO1/GPL12 on processor
7	GPJ2	GPIO Port J Bit 2	
8	MOSI1/GPL11	GPIO Port L Bit 11 (also SPI Master Output)	Tied to SPIMOSI1/GPL11 on processor
9	GPJ3	GPIO Port J Bit 3	
10	SCLK1/GPL10	GPIO Port L Bit 10 (also SPI Clock)	Tied to SPICLK1/GPL10 on processor
11	GPJ4	GPIO Port J Bit 4	
12	AIN0	Analog Input 0	Tied to AIN0 on processor
13	GPJ5	GPIO Port J Bit 5	
14	AIN1	Analog Input 1	Tied to AIN1 on processor
15	GPJ6	GPIO Port J Bit 6	
16	GPJ9	GPIO Port J Bit 9	
17	GPJ7	GPIO Port J Bit 7	
18	3.3V	Power Supply	100 mA
19	GPJ8	GPIO Port J Bit 8	
20	3.3V	Power Supply	100 mA
21	GND	Ground	
22	GND	Ground	

4.5. UART, SPI, I²C, and INT (J1)

Connector part number is equivalent to Molex 87758-2016.
 Mating connector is Molex 79107-7009 or equivalent.

Table 9

Pin No.	Symbol	Description	Remarks
1	N/C	No Connect	
2	N/C	No Connect	
3	IIC_SCL	I ² C Clock	
4	N/C	No Connect	
5	IIC_SDA	I ² C Data	
6	EINT0/GPF0	GPIO Port F Bit 0 (also External Interrupt 0)	Tied to EINT0/GPF0 on processor
7	N/C	No Connect	
8	N/C	No Connect	
9	N/C	No Connect	
10	MOSI0/GPE12	GPIO Port E Bit 12 (also SPI Master Output)	Tied to SPIMOSI0/GPE12 on processor
11	N/C	No Connect	
12	SCLK0/GPE13	GPIO Port E Bit 13 (also SPI Clock)	Tied to SPICLK0/GPE13 on processor
13	GND	Ground	
14	MISO0/GPE11	GPIO Port E Bit 11 (also SPI Master Input)	Tied to SPIMISO0/GPE11 on processor
15	RSTOUT	Reset Output	Driven low when the processor resets
16	TXD0/GPH0	GPIO Port H Bit 0 (also UART Tx)	Tied to TXD0/GPH0 on processor
17	3.3V	Power	100 mA
18	RXD0/GPH1	GPIO Port H Bit 1 (also UART Rx)	Tied to RXD0/GPH1 on processor
19	N/C	No Connect	
20	N/C	No Connect	

4.6. Ethernet, RS-232, and RS-485 (J3)

Connector part number is equivalent to Molex 87759-2014.

Mating connector is Molex 79107-7010 or equivalent.

Table 10

Pin No.	Symbol	Description	Remarks
1	GND	Ground	
2	GND	Ground	
3	3.3V	3.3V Power Output	100 mA
4	3.3V	3.3V Power Output	100 mA
5	RXI-	Ethernet RXI-	
6	RXI+	Ethernet RXI+	
7	TXO+	Ethernet TXO+	
8	TXO-	Ethernet TXI+	
9	SPEED	Ethernet Speed	L = 100 Mbps, Float = 10 Mbps
10	LED Link	Ethernet Link Light	
11	GND	Ground	
12	GND	Ground	
13	RS485 B	RS485 B	RS-485 is driven by TXD2 and RXD2 on processor
14	RS485 A	RS485 A	
15	GND	Ground	
16	GND	Ground	
17	12V	12V Power Input	250 mA
18	12V	12V Power Input	250 mA
19	12V	12V Power Input	250 mA
20	12V	12V Power Input	250 mA
21	RS232 Rx	RS232 Rx	RS-232 is driven by TXD1 and RXD1 on processor
22	RS232 Tx	RS232 Tx	

4.7. Microphone (J97)

Connector part number is equivalent to Molex 53047-0210.

Mating connector is Molex 51021-0200 or equivalent.

Table 12

Pin No.	Symbol	Description
1	MIC	Microphone Input
2	GND	Ground

4.8. Speaker (J98)

Connector part number is equivalent to Molex 53047-0210.

Mating connector is Molex 51021-0200.

Table 13

Pin No.	Symbol	Description
1	SPK1	Speaker Output 1
2	SPK2	Speaker Output 2

Note: Mating speaker must be 8Ω

5. Replacing the Operating System Image

You can replace the Windows CE image with your own image. Once you have built your NK.bin file, follow these steps to load it into the Cascade 4300.

You will need to an RS-232 serial cable between your PC and the Cascade 4300. The RS-232 port is available on an internal connector on the Cascade 4300 PCB. You will also need a USB cable, but it should not be attached at the beginning of the procedure. The USB device port is located just below the SD card slot. The connector type is mini-USB Type B.

Once the RS-232 cable is in place, insert the Cascade 4300 CD in your PC and follow these steps:

- 1) Make sure that the Cascade 4300 is turned off.
- 2) On the CD run \Image Downloader\DNW.exe.
- 3) Go to the Configuration->Options menu. Set the COM port. Set the baud rate to 115200.

Note: DNW only supports COM1 through COM4. If you are using a higher COM port, you can use any terminal program for the serial communications part of this procedure.

Note: If you want DNW to save your options as the default settings, copy the entire Image Downloader folder to your hard drive and run DNW from there.

- 4) Set the USB Port Download Address to 0x30200000 (this should be the default) and select OK.
- 5) Select Serial Port->Connect.
- 6) Turn on the Cascade 4300.
- 7) The boot loader shows a 5 second countdown in the serial window. Press the space bar during these 5 seconds to enter the EBOOT menu.
- 8) Connect the USB cable. The title bar of DNW should show [USB:OK].

Note: The first time you attach the USB cable you will be prompted to install the USB driver. Navigate to the Cascade 4300 CD and select the Image Downloader folder. When prompted, choose the first entry in the list. When prompted for a CD, navigate again to the Image Downloader folder.

- 9) Press 5 to set the startup image to LAUNCH EXISTING.
- 10) Press 6 to set the Program disk image into SmartMedia card to Enabled.
- 11) Press F to perform a low level format of the Flash.
- 12) Press U to start downloading the new NK.bin file.
- 13) Select USB Port->UBOOT (WINCE500)->UBOOT.

14) Select your new NK.bin file.

Note: The NK.bin file that shipped with your unit is located on the Cascade 4300 CD at \OS Image\Default NK.bin.

15) During the download you may see messages stating that some sectors are not writeable. This is normal.

16) When the download is finished, Done will be displayed.

17) Cycle power to the Cascade 4300 to begin running with the new OS image.

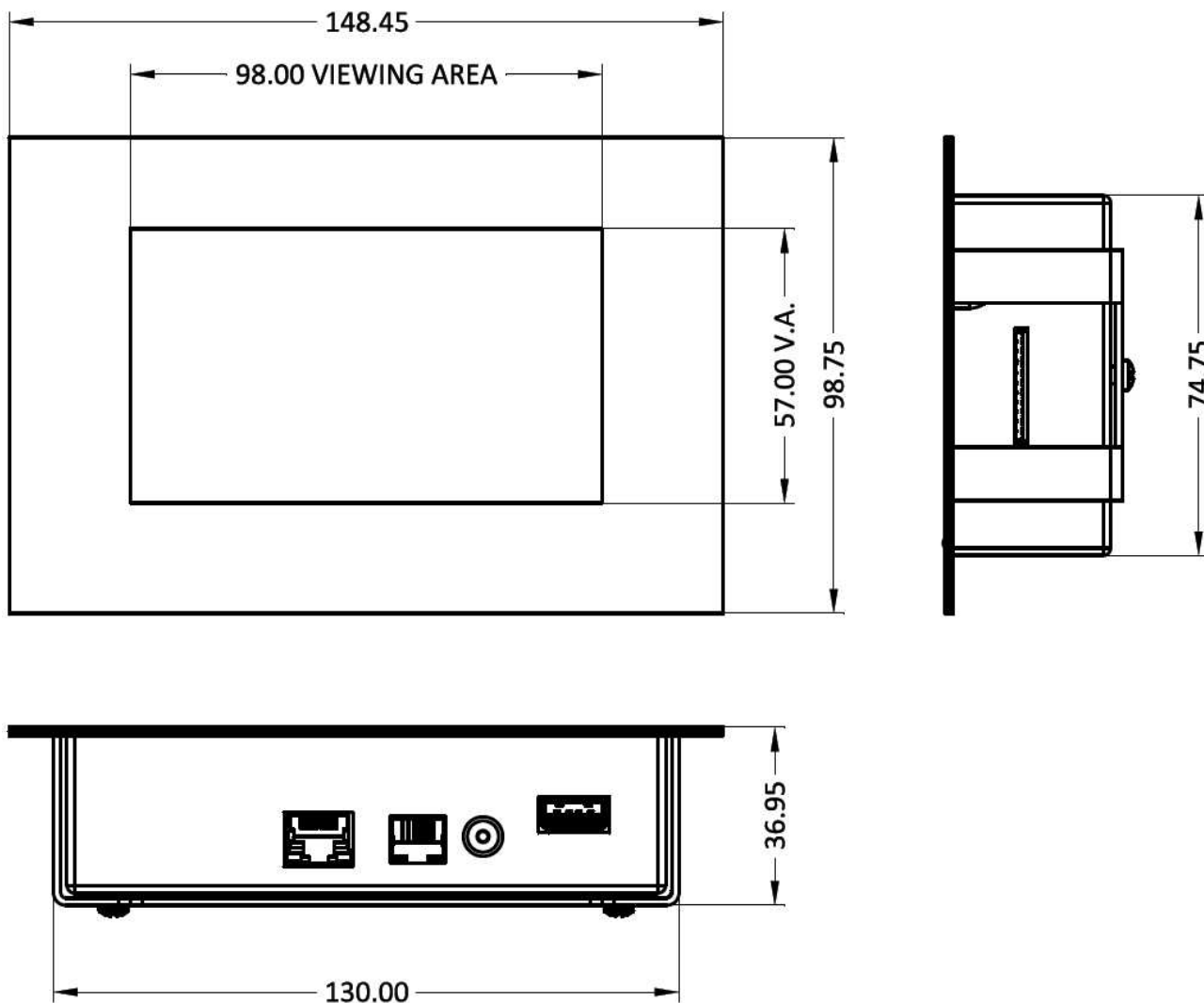
6. Quality Assurance

Table 14

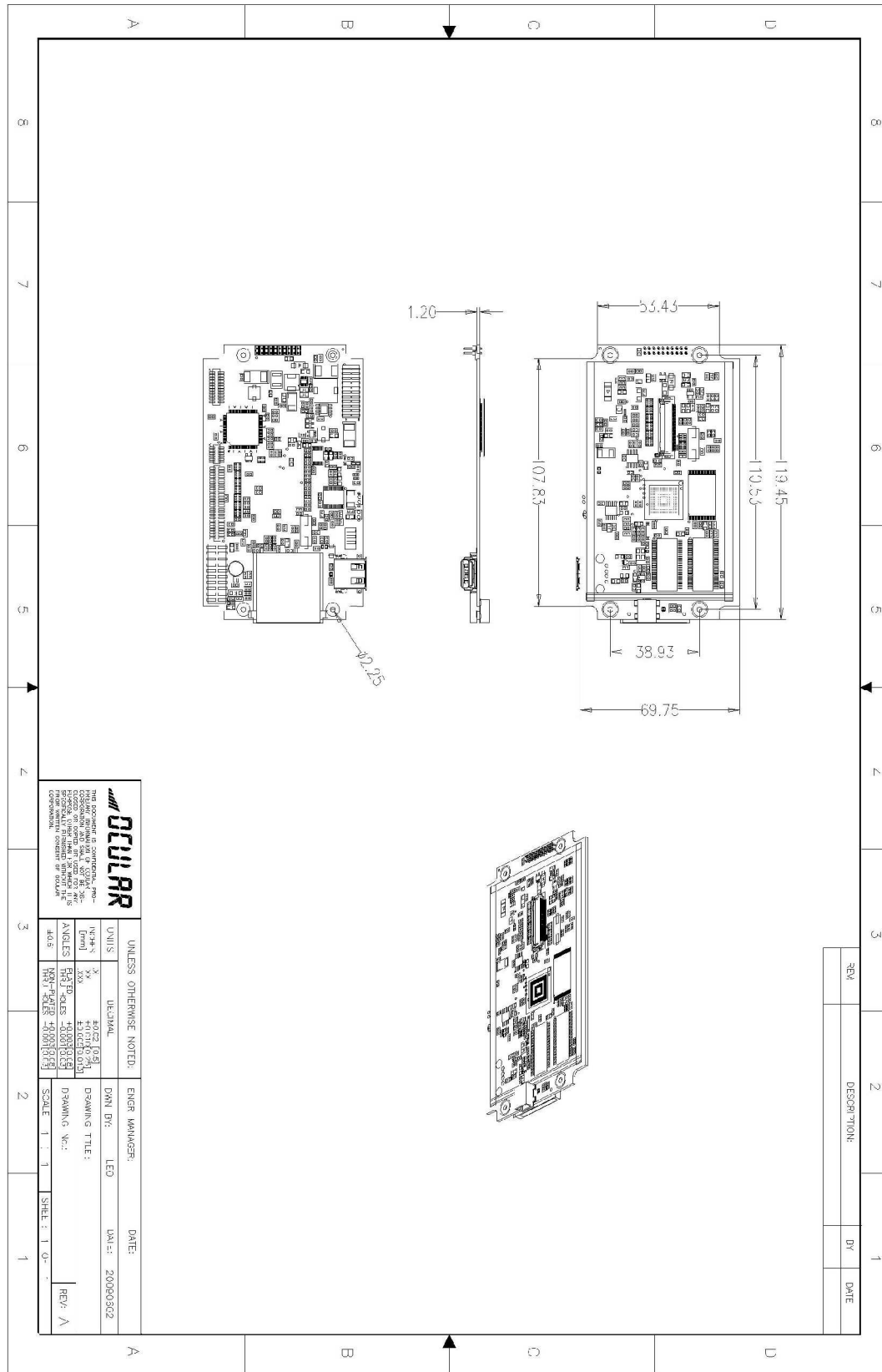
No.	Test items	Test condition
1	High Temperature Operation Test	Ta=60°C Dry 24h
2	Low Temperature Operation Test	Cold start @ -20°C Operational @ 0°C for 24h
3	High Temperature and High Humidity Operation Test	Operational @ 60°C 90%RH for 240h
4	Electro Static Discharge Test	±8KV (Contact) ±15KV (Air)
5	Vibration Test (non-operating)	Sine wave, 10Hz to 50Hz 1.5mm amplitude 3 axis, 2 hours/axis

7. Mechanical Drawing

7.1. Enclosure



7.2. Main PCB Outline



7.3. Power Board PCB Outline

